**What is Claimed is:**

1. A method for automatic set up of Raman gain within an optical transmission fibre adapted to carry a plurality of optical transmission channels and having at least one optical pump operable to cause the fibre to exhibit Raman amplification, the method comprising:

modulating the power of said optical pump(s);

**detecting the effect of said modulation on the gain of each said transmission channel; and**

**adjusting the power of the pump(s) in dependence on the effect detected in step (b).**

2. The method of Claim 1, wherein said modulating step (a) is carried out by applying a dither signal to said optical pump(s).

3. The method of Claim 1, further comprising:

(d) storing data relating to the power of said transmission channels under full load conditions prior to said modulating step (a);

(e) storing data relating to the power of said transmission channels during said detecting step (b);

(f) comparing stored data derived from step (d) with stored data derived from step (e) to obtain a difference signal; and

(g) adjusting the power of said optical pumps in dependence on said difference signal.

4. The method of Claim 3, wherein said optical pump comprises a plurality of optical pump sources and said method is applied to each of said sources in turn.

5. The method of Claim 4, wherein said difference signal comprises the data [Original shape($\lambda$)] obtained under full load conditions in step (d) reduced by a factor relating to the contribution made by each said source in turn, according to the algorithm:

Fibre gain($\lambda$) = [Original shape($\lambda$)]-[($\Delta Pp_{xnm}$/N)*($Pc_{xnm}(\lambda)$]$_R$

**where:**

Fibre gain($\lambda$)is the predicted value for the gain of the fibre as a function of wavelength $\lambda$;

$\Delta Pp_{xnm}$ is the difference in pump power at a wavelength of Xnm between the power required for the original gain shape and the new pump power;

$Pc_{xnm}$ is the contribution from the pump source of wavelength Xnm as measured by reducing the pump power by NmW from the original power, and

R represents the number of individual pump sources whose contributions are deducted from [Original shape(λ)].

6. The method of claim 5, wherein said steps (a) to (g) are performed iteratively over all transmission channels.

7. A method for determining the gain profile of a Raman optical transmission fibre having a plurality of optical pumps and adapted to carry a plurality of optical transmission channels, the method comprising:

(a) storing data relating to the power of each of said transmission channels in turn under full load conditions;

(b) modulating the power of said optical pumps in turn;

(c) detecting the effect of said modulation on the gain of each of said transmission channels;

(d) storing data relating to the gain of said transmission channel(s)during said detecting step (c);

(e) comparing stored data derived from step (a) with stored data derived from step (e) to obtain a difference signal; and

(f) adjusting the power of said optical pumps in dependence on said difference signal.

8. Apparatus for automatically controlling the gain of each of a plurality of optical transmission channels in an optical transmission fibre operable so as to exhibit Raman amplification, the apparatus comprising;

(a) at least one pump for applying optical power to the fibre to cause it to operate as a Raman amplifier;

(b) a modulator to modulate said optical power;

(c) a detector for detecting the depth of modulation of a signal transmitted over the channel subjected to the modulated pump;

(d) a comparator to determine the variation in modulation depth of the signal subjected to said modulation compared to the signal prior to modulation; and

(e) control means for adjusting the power of the pump in dependence on the output of the comparator, whereby to obtain an indication of the gain profile of each of said transmission channels.

9. Apparatus as claimed in Claim 8, further comprising:

(f) a plurality of said pumps;

(g) means for modulating in turn each said channel when pumped by a respective said pump;

(h) means for storing data derived from said detector and relating to the gain profile of each said channel; and wherein said control means adjusts the power of each said pump according to the following algorithm:

Fibre gain($\lambda$) = [Original shape($\lambda$)]–[($\Delta Pp_{xnm}/N$)*($Pc_{xnm}(\lambda)$]$_R$

**where:**

Fibre gain($\lambda$) is a predicted value for the gain of the fibre as a function of wavelength $\lambda$;

$\Delta Pp_{xnm}$ is the difference in pump power at a wavelength of Xnm between the power required for the original gain shape and the new pump power;

$Pc_{xnm}$ is the contribution from the pump source of wavelength Xnm as measured by reducing the pump power by NmW from the original power, and

R represents the number of individual pump sources whose contributions are deducted from [Original shape($\lambda$)].

10. Apparatus as claimed in Claim 9 comprising a computer programmed to perform the said algorithm.

11. Apparatus as claimed in Claim 10 further comprising storage means carrying a program to perform said algorithm.

12. A carrier containing software permitting a computer to carry out the method of Claim 1.

13. A carrier containing software permitting a computer to carry out the method of Claim 7.

14. A computer programmed to perform the method of Claim 1.

15. A computer programmed to perform the method of Claim 7.

16. An optical signal amplified by an optical transmission fibre exhibiting Raman gain and forming part of the apparatus as claimed in Claim 8.

17. An optical signal amplified by an optical pump operable on an optical transmission fibre to cause Raman gain by the method claimed in Claim 1.

18. An optical signal amplified by an optical pump operable on an optical transmission fibre to cause Raman gain by the method claimed in Claim 7.